Deconstruction at Fort Ord: Portable Machine Strips Lead Paint From Siding

By Dana Finney

A new self-contained remilling and recovery system can process lead-based paint (LBP)-covered wood at deconstruction sites, planing off the contaminated surface and leaving a clean, reusable board. In a demonstration at the former Fort Ord, CA, the system salvaged over 56% of the wood siding removed from two barracks. Besides reclaiming the lumber, this process diverted several tons of solid waste from landfills, including hazardous LBP.

The U.S. Army Research and Development Center (ERDC) is conducting several studies that seek to expand deconstruction and reuse of Army buildings slated for removal. Some 50 million square feet of surplus buildings must be removed from installations by FY05. Given that demolishing an average two-story WWII barracks produces nearly 80 tons of debris, Army-wide, the result would be a staggering volume of solid waste if no efforts are made to reclaim this material.

"With tens of thousands of WWII-era wooden buildings still remaining on Army installations, the potential exists for recovering significant amounts of premium lumber rather than disposing of this natural resource and using up landfill space," said Richard Lampo, researcher at ERDC's Construction Engineering Research Laboratory (CERL).

The portable remilling machine demonstrated in California represents a unique adaptation of equipment produced by Wood Waste Diversion, Inc., and Auburn Enterprises, LLC. The system mechanically planes off the LBP and a thin layer of wood underneath. This results in a bare piece of lumber. The wood shavings with the waste paint are captured and collected separately. The system is trailer-mounted and can be easily transported to a deconstruction site.

CERL demonstrated this technology in partnership with the U.S. Department of Agriculture's Forest Products Laboratory (FPL), Pennsylvania State University (PSU), CTC, Inc., and the manufacturers. Fort Ord, the largest Army installation to close under Base Realignment and Closure, has over

1,400 wooden buildings left that will have to be removed before the property can be redeveloped for civilian use.

"The quality of the wood siding in the Fort Ord buildings is the best I've seen," said Dr. Robert Falk, research engineer at FPL in Madison, WI. "Most of it is old-growth Douglas fir lumber and is of the highest quality ever produced. It is tight grained, dry, and has few defects. In checking 14,000 linear feet of painted siding– that equates to nearly 3 miles – we found less than 10 knots."

Short-run demonstration results for the remilling system suggest that it could process the siding from one building every hour, said CERL researcher Tom Napier. He added that an air quality team tested the work area for airborne lead levels, both personal and ambient, during the demonstration. The levels detected were not considered to be problematic.

The Wood Waste Diversion-Auburn system represents one of several emerging technologies that could help overcome obstacles to deconstruction. Two critical issues are (1) dealing with the LBP that covers much of the wood and (2) finding viable markets for the reclaimed wood. Falk has also devised methods to strip LBP from the Fort Ord siding and create new building materials using standard woodworking equipment in-house at FPL. ERDC is evaluating each process in light of the fact that what works at one deconstruction site may not work at another.

While the portable system removes most of the LBP from the lumber, there are still the wood shavings and paint residue to address. Lampo believes this material could also be largely recycled.

"We're looking at technologies that might be able to condense the waste and recover lead for uses such as batteries. One company, ARI Technologies [Tacoma, WA,] has a thermochemical system that might work with some modifications," said Lampo. He is also investigating other recovery and disposal methods.

The material removed from the Fort Ord buildings was a #105 drop siding profile. The siding boards' thickness has implications on how that material might be reused. CERL's Napier said, "A standard tongue-and-groove [T&G] flooring profile can be milled from the siding boards, and the quality of the Fort Ord material suggests T&G flooring would be an excellent use. Furthermore, pieces as short as 16 inches can still be used as flooring, which means fewer boards are wasted. Bevel siding and V-groove paneling are also good uses, but will require the full length siding boards."

Work by the FPL and PSU indicates that the market for products remilled from Fort Ord siding is very promising. At the Wisconsin laboratory, FPL and PSU evaluated the feasibility of producing clean T&G flooring,

Clean T&G flooring (*top*) produced from painted siding (*bottom*).

V-groove paneling, and lapped bevel siding from the painted siding. Falk agrees that flooring is a very feasible product, as it can use shorter pieces. In addition, antique Douglas fir T&G flooring currently sells for about $4-$7 per square foot.

"At this selling price, the buildings slated for disposal at Fort Ord alone have the potential to produce millions of dollars in value-added product. However, while we see great potential, we don't have all the answers on the costs associated with making these products," he said.

The system manufacturers are continuing to optimize their technology. One goal is to produce a finished product onsite rather than transporting the bare wood to another facility. The FPL-PSU process currently has an advantage in this respect since both cleaning and remilling occur at the same site. However, LBP-coated wood has to first be transported in that process.

For more information about this project or any of ERDC's deconstruction research, please contact Richard Lampo, 217-373-6765, r-lampo@cecer.army.mil or Tom Napier, 217-373-3497, t-napier@cecer.army.mil.